

1  
2  
3  
4

**Justification for Programs or Projects  
In Excess of \$1 Million**

Sustaining Capital Programs .....	Ref. S1 to S19
Development Capital Programs .....	Ref. D1 to D16
Operations Capital Programs .....	Ref. O1 to O2
Shared Services and Other Capital .....	Ref. IT1 to IT3
.....	Ref. C1 to C3

## Hydro One Distribution- Investment Justification Spare Distribution Transformer Investments

**Investment Driver:** DC108

**Reference #:** S1

**Investment Name:** Spare Distribution Transformer Investments

**In-Service:** December, 2008

**Need:**

This investment is required to maintain the distribution spare transformer population at sufficient levels to respond to equipment failures.

Not proceeding with this investment would result in a lack of spare transformers, a deterioration of overall customer supply reliability and increase the risk of prolonged outages during equipment failures.

**Investment Summary:**

Hydro One Distribution's system utilizes 1,477 in-service transformers and regulators, ranging in size from 0.5 to 40 MVA in 71 different categories and up to 70 years in age. These devices are made up of several components and sub-systems, which are subject to wear and tear, resulting in occasional failure. The average life of the in-service transformers and regulators is in the range of 30-50 years and the average age is increasing.

Over the last four years the distribution system has averaged about 32 transformer failures per year. Following a failure, a spare transformer is usually moved into service reducing the available spares complement. As the age of transformers increases, it becomes crucial that a sufficient number of replacement transformers be available as functional operating spares, as the number of failures are expected to increase. A comprehensive transformer spare complement strategy has been developed to ensure the correct number and type of spares are available in order to respond to failures.

This investment addresses the current gap and requires the purchase of three transformers and one regulator. The ratings are as follow:

- One 7.5/12.5 MVA, 115.5/8.8 kV transformer
- One 5 MVA, 27.6/8.32-4.16 kV transformer
- One 6 MVA, 44/13.2 kV transformer
- One 10 MVA, 12.47 kV regulator

**Results:**

- Purchase three (3) step-down transformers and one (1) regulator to meet future failure demand.
- Maintain customer connection reliability by restoring full operating capability through the timely and unencumbered dispatch of operating spare transformers.
- Maintains the availability of mobile substations for failure response and to support the Stations OM&A and Capital programs, as mobile substations would be used in lieu of spare transformers, if spares were not available.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (MFA) (A)	3.5
Operations, Maintenance & Administration (OM&A) and Removals (B)	-
<b>Gross Investment Cost (A+B)</b>	<b>3.5</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>3.5</b>

\*Includes Overhead and Allowance for Funds Used During Construction (AFUDC) at current rates

## Hydro One Distribution– Investment Justification Mobile Substation Refurbishment

**Investment Driver:** DC 108

**Reference #:** S2

**Investment Name:** Mobile Substation Refurbishment

**In-Service:** December, 2008

**Need:**

This investment is required to provide for the safe operation of a fleet of 28 mobile substations and to maintain their performance at acceptable levels.

Consequences of not proactively managing the population of mobile substations include increased safety risks during transportation, an inability to restore power in a timely manner and the unavailability of replacement transformers required to complete maintenance programs thereby increasing reliability risks.

**Investment Summary:**

Hydro One Distribution's spare transformer strategy requires the availability of mobile substations for first-response power restoration.

As transportable mobile units, mobile substations must adhere to the requirements of the Highway Traffic Act. They receive annual inspections (time-based) for trailer certifications and power system components, as well as detailed inspections that occur each time units are dispatched for service. Inspection reports are used to track asset condition and to prioritize refurbishment.

This investment provides \$1.5 million to complete mobile substation refurbishments to correct equipment deficiencies, and to replace reclosers on Unit # 30 (115/27.6 kV) and to purchase a new 27.6/8 kV transformer for Unit # 02.

**Results:**

- Maintain customer reliability by ensuring the availability of mobile substations to restore power when in-service transformers fail.
- Ensures mobile substations remain in good repair and do not present safety hazards.
- Minimize the life cycle costs of station facilities by reducing operating and maintenance expenditures and outage requirements through an integrated spares and mobile substation utilization.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets (A)	1.5
Operations, Maintenance & Administration and Removals (B)	-
<b>Gross Investment Cost (A+B)</b>	<b>1.5</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>1.5</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution– Investment Justification Distribution Stations Refurbishment

**Investment Driver:** DC108

**Reference #:** S3

**Investment Name:** Distribution Stations Refurbishment

**In-Service:** December 2008

**Need:**

This investment is required to maintain customer reliability and performance of distribution stations, as well as ensuring employee safety by addressing end-of-life assets.

Not proceeding with this investment would decrease distribution system reliability and compromise employee safety.

**Investment Summary:**

Hydro One Distribution's system is designed as a single-element, radial-fed distribution network. Distribution stations are a major element in this chain and are composed of individual components that must function as designed in order to maintain reliability and employee safety.

Stations require refurbishment because equipment and structures lose their capability to perform as intended based on ageing and/or utilization. Investments are prioritized based on ACA results, historical performance, availability of spares and additional criteria that includes, customer satisfaction, safety, and improvement in design standards.

Refurbishment that includes end of life transformer, structure and recloser replacement will be completed at the following stations: Iroquois Dam DS, Sioux Narrows DS, Navan DS, Brockville Parkdale DS, Lindsay Eglington DS and Parkhill South DS. Site expansion and structure egress cable relocation is planned for Durham Elgin DS to allow for the connection of a mobile substation. This will be achieved by separating the three feeders (currently egressing on one pole) onto three different poles.

**Results:**

- Maintain customer reliability by replacing end-of life assets and by introducing updated designs and components.
- Replace end of life assets to comply with regulatory requirements.
- Address employee safety issues.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets (A)	2.5
Operations, Maintenance & Administration and Removals (B)	0.3
<b>Gross Investment Cost (A+B)</b>	<b>2.8</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>2.5</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution– Investment Justification Demand and Planned Component Replacement

Investment Driver: DC108

Reference #: S4

Investment Name: Demand and Planned Component Replacement

In-Service: December 2008

**Need:**

This investment is required to maintain the safe operation and acceptable performance of Distribution Stations by addressing emergency situations and replacing end of life components

Not proceeding with this investment would decrease customer reliability and compromise employee safety.

**Investment Summary:**Demand Work – \$1.8M

This investment provides \$1.8 million to repair equipment when it fails, or when there is a need to repair equipment in a timely manner to secure reliability or safety. These failures are difficult to predict, but must be repaired quickly because they generally result in customer interruptions or present significant safety risks. Funding levels are based on historical trends and adjusted to reflect recent experience.

Planned Component Replacement – \$0.8M

Components are replaced when their condition has deteriorated to a point where there is a risk of failure and the component has reached end of life, or where the performance has reached unacceptable levels. Component replacements are identified through ACA, routine station inspections and safety investigations, and can include reclosers, switches, fences and gates, surge arrestors, and transformer components.

Part of the component replacement program will address end of life breakers and reclosers by replacing these with new vacuum reclosers. This is a new technology that provides cost savings through improved performance, reduced maintenance and these reclosers provide added protection flexibility.

**Results:**

- Respond to outages in an expedient manner and address immediate reliability and safety risks.
- Improve system reliability by replacing end of life components.
- Replace end-of-life assets to comply with regulatory requirements.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	2.6
Operations, Maintenance & Administration and Removals (B)	-
<b>Gross Investment Cost (A+B)</b>	<b>2.6</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>2.6</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Trouble Calls and Storm Damage

**Investment Driver:** DC106

**Reference #:** S5

**Investment Name:** Trouble Calls and Storm Damage

**In-Service:** December, 2008

**Need:**

This demand program funds the repair of assets where there has been a power interruption, or where situations pose reliability or safety risks that require immediate attention. The facilities covered under this program include all distribution line assets.

Failure to respond to trouble calls and storm damage, and situations where components or equipment are near failure would result in unacceptable safety and reliability risks to Hydro One Distribution.

**Investment Summary:**

Hydro One Distribution's system services about 1.2 million customers that place a high value on both reliability and quality of power. This is a demand program needed to restore power, maintain reliability and safety, and respond to customer needs in a manner that meets regulatory requirements. It includes:

- Emergency pole replacements
- Emergency equipment and component replacements
- Response to power quality issues
- Submarine and underground cable failures/problems
- Storm Damage response
- Damage claims

Hydro One Distribution is obligated to provide this service in accordance with good utility practice and the requirements of the Distribution System Code.

Trouble call response affects the company's performance on a number of OEB-specified service quality requirements; specifically, SAIDI and CAIDI reliability indices.

The funding of this program is based on historical accomplishments where the average volume of work and expenditures over the last 4 years is the primary consideration in setting forecast levels, although other mitigating factors may be considered (e.g. discounting extraordinary storm years).

The funding of this program is based on historical accomplishments as follows:

	2004	2005	2006	2007 Projected	2008 Proposed
Poles Replaced (units)	890	1,428	1,393	1,150	1,250
Equipment Replaced (units)	2,806	3,091	2,877	2,800	2,900
Storm Damage (\$M)	14.0	26.3	62.0	26.0	26.0

**Results:**

- Ensures Hydro One Distribution promptly meets its obligation to provide customers with safe and reliable service.
- Comply with regulatory requirements.

**Costs:**

- The costs for forestry and premium time incurred as part of storm damage restoration are captured as part of OM&A Trouble Calls.
- Includes \$2.5M that is recovered through damage claims.

	2008 (\$M)
Capital * and MFA (A)	55.9
Operating, Maintenance & Administration and Removals (B)	4.2
<b>Gross Investment Cost (A+B)</b>	<b>60.1</b>
Capital Contribution (C)	(2.5)
<b>Net Capital (A+C)</b>	<b>53.4</b>

\*Includes overhead and Allowance for Funds During Construction at current rates

## Hydro One Distribution – Investment Justification Joint Use and Line Relocations

**Investment Driver:** DC103

**Reference #:** S6

**Investment Name:** Joint Use and Line Relocations

**In-Service:** December, 2008

**Need:**

This is a demand program that covers joint-use work that Hydro One Distribution is obligated to provide in order to meet its contractual obligations to joint use partners in accordance with existing Joint Use Agreements.

This program also covers line relocation work that must be carried out at the request of Municipal and Provincial road authorities as per the requirements of the Public Service Work on Highways Act and associated Ministry of Transportation guidelines. It also includes relocation work requested by customers in accordance with Hydro One Distribution's Conditions of Service.

**Investment Summary:**

Investment details for the two components of this program are provided below:

**Joint Use**

This work covers changes/upgrades to Hydro One Distribution assets to accommodate the use of the assets by joint use partners such as telecommunication or cable companies (communication circuits), municipalities (street lighting) or local distribution companies (power circuits). The cost sharing provisions in joint use agreements allow Hydro One Distribution to recover its costs resulting from requests to add new attachments to poles. Costs recovered include those to increase pole class to accommodate changes in pole loading, increased height to obtain appropriate ground clearances for public safety, as well as costs associated with premature retirement of in-service assets.

**Line Relocations**

The Line Relocation component of this program covers the work required in response to road modifications initiated by Provincial or Municipal Road Authorities, or by individuals who require assets relocated for the purpose of developing their property. Hydro One Distribution occupies road allowances at no cost and in return is required, on occasion, to install, relocate or reconstruct its facilities in order to accommodate the specific requirements of the road authorities. Most commonly, this involves relocating lines to accommodate changes to roads, highways and bridges. The cost of the plant relocation is either fully or partially recoverable, depending on the specific circumstances of each project.

The number of relocation projects can vary significantly from year to year depending on the number of government infrastructure projects and economic conditions influencing individual 3<sup>rd</sup> party development projects.

This program involves the management and construction of 400 to 600 line projects on an annual basis.

Projected spending is based on historical costs taking into account any observed trending and identified joint-use and relocation work scheduled for 2008.

**Results:**

Hydro One Distribution will meet its contractual and legal obligations, and maintain property rights for Hydro One Distribution lines located on road allowances.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	32.7
Operating, Maintenance & Administration and Removals (B)	1.2
<b>Gross Investment Cost (A+B)</b>	<b>33.9</b>
Capital Contribution (C)	(9.0)
<b>Net Capital (A+C)</b>	<b>23.7</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rate

## Hydro One Distribution – Investment Justification Wood Structure Replacement Program

**Investment Driver:** DC102

**Reference #:** S7

**Investment Name:** Wood Structure Replacement Program

**In-Service:** December, 2008

**Need:**

This program is needed to ensure that sub-standard wood poles that have reached their end-of-life are replaced on a timely and economic basis.

Not proceeding with this investment would increase the risk of failure under adverse conditions, leading to reduced reliability, as well as increasing public and employee safety risks.

**Investment Summary:**

Hydro One Distribution's system includes about 1.65 million wood poles that support approximately 113,500 kilometers of overhead circuits. This program funds the replacement of poles that have been determined to be at end-of-life as established through pole assessment techniques based on industry standards. Wood poles deteriorate over time and when their strength is reduced to the point that there is a risk of failure under adverse weather conditions, they are deemed to be at end of life. Planned replacement of poles costs much less than "emergency" or reactive replacement and will be much less disruptive to customers. As such, over the long term, there is a compelling business need to replace poles in a proactive manner, consistent with good utility practice.

Pole replacements are determined through Hydro One Distribution's pole assessment program. As of the end of 2006 approximately 50% of the pole population will have been tested, tagged with barcodes and had their respective geographic coordinates identified and recorded. Annual testing targets are to remain at about 300,000 poles. Historically, about 4% of those inspected have been found to be substandard. Based on the 2007 pole testing program and deducting substandard poles that will be replaced under other programs, it is projected that 7,000 poles will need replacement during 2008. The replacement of these poles will remove substandard poles from the system thereby maintaining reliability, and ensuring compliance with Canadian Standards Association requirements for end of life pole replacement.

Aside from this program, poles are also replaced under other programs including those dealing with trouble calls and storm damage, system capability reinforcement, sustainment projects, line relocations and joint use modifications. It is estimated that an additional 9,000 to 13,000 poles will be replaced under these other programs.

**Results:**

- Replace end-of-life assets to comply with utility standards, and regulatory and legal requirements.
- Maintain customer reliability by replacing end of life wood pole structures.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	39.8
Operating, Maintenance & Administration and Removals (B)	4.3
<b>Gross Investment Cost (A+B)</b>	<b>44.1</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>39.8</b>

\*Includes overhead at current rates. No Allowance for Funds Used During Construction is included due to monthly capitalization.

## Hydro One Distribution – Investment Justification Waste Storage Tank Replacement

Investment Driver: DC104

Reference #: S8

Investment Name: Waste Storage Tank Replacement

In-Service Date: December 2008

**Need:**

This investment is required to fund the replacement of Hydro One Distribution's end-of-life PCB storage tanks (shipping containers) to prevent oil leaks and spills and to comply with legislative requirements.

Not proceeding with this investment will potentially harm the environment and place Hydro One Distribution in non-compliance with Environmental Regulations should oil and waste leak from the existing deteriorated containers.

**Investment Summary:**

As part of operations, Hydro One Distribution manages activities (e.g. clean up, notification, documentation, storage transportation, containment, security, inventory, inspection, reporting) related to PCBs and other wastes. The wastes, which may be in the form of liquid (e.g. oil) or solid (i.e. spill remnants, discarded contaminated equipment - pole transformers, capacitors, reclosers), are collected at numerous sites throughout the province and placed in storage tanks (for liquids) and containers (for solids). Once economical quantities of a particular waste class are gathered in these units, disposal is arranged through third party facilities.

For Hydro One Distribution waste management, the current inventory of tanks and containers is distributed at 90 sites in the province. The vast majority of waste storage tanks and containers are on average more than 20 years old. The ageing population includes a number of units that are at end-of-life and need to be replaced, i.e. corroded and developing cracks. This investment covers the replacement of PCB and waste storage tanks at 29 service centers. This investment is the second year of a 4 year program.

The deteriorated and end-of-life shipping containers pose a high risk of leakage and are very difficult to inspect or maintain due to their enclosed and compartmentalized nature. These units cannot be repaired and must be replaced to ensure environmental compliance.

**Results:**

- The replacement of PCB and other waste product storage tanks that are approaching end-of-life so that Hydro One Distribution can prevent spills and damage to the environment.
- The prudent management of environment risks and compliance with regulatory requirements.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.2
Operating, Maintenance & Administration and Removals (B)	-
<b>Gross Investment Cost (A+B)</b>	<b>1.2</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>1.2</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Defective Crossarm Replacement Program

**Investment Driver:** DC107

Reference #: **S9**

**Investment Name:** Defective Crossarm Replacement Program

**In-Service:** December, 2008

**Need:**

This investment is required to address defective wood crossarms on the Hydro One Distribution system. Having been identified as defective, these crossarms must be replaced on a planned basis to address safety and reliability risks and to comply with the requirements of the Distribution System Code.

Not replacing defective crossarms would lead to reduced feeder reliability, potential safety hazards and violation of the Distribution System Code.

**Investment Summary:**

Distribution lines' equipment deteriorates over time and must be replaced when it reaches end-of-life. Crossarms are a major component on the distribution system as they are fastened to poles and support the insulators and conductors. Once these components have reached end-of-life (i.e. wood rot, severely cracked, twisted or burnt) the likelihood of their failure increases and safety and customer reliability risks reach unacceptable levels.

Each defective wood crossarm that is identified through visual inspections as part of the patrol program is given a defect rating. Crossarms that are found to be in extremely poor condition are scheduled for emergency replacement under the trouble call program. The remainder of the defective crossarms are recorded and are scheduled for replacement in order to prevent failures and address reliability issues..

In 2008, 2,000 cross-arms are expected to be replaced, from those identified during line patrols from previous years.

**Results:**

- Replace approximately 2,000 defective wood crossarms during 2008 to eliminate known safety hazards to the public and to Hydro One Distribution staff
- Replace defective wood crossarms before failure and thereby address customer reliability risks.
- Replace end of life components to comply with regulatory requirements.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.7
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	<b>1.9</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>1.7</b>

\*Includes Overhead at current rates. No Allowance for Funds During Construction is charged due to monthly capitalization.

## Hydro One Distribution – Investment Justification Submarine Cable Replacement Program

**Investment Driver:** DC107

Reference #: **S10**

**Investment Name:** Submarine Cable Replacement Program

**In-Service:** December, 2008

**Need:**

This investment is required to replace sections of submarine cables at the shoreline, whose neutral/armour wires have corroded and pose safety and reliability risks, and to replace deteriorated submarine cables that have experienced a high rate of failure.

If this work is not completed, there is a likelihood of serious injury to the public as a result of fault current from damaged cables at the shoreline. Furthermore, customer reliability expectations may not be met.

**Investment Summary:**

There are approximately 2,200 circuit kilometers (single-phase) of submarine cable that are used mainly to supply seasonal island dwellings. These cables lie in rocky terrain and cross small and larger lakes, where it is difficult and expensive to build overhead lines. As a result, submarine cables provide the most cost effective solution by which to serve customers in these areas.

Asset condition assessments and past failures have shown that many of the cables, particularly at the shoreline are exposed to the elements. The ice and rocks abrade the protective armour wire allowing corrosion of the steel. This results in a loss of mechanical strength and creates a discontinuity in the grounding of the cable. The sheathing on the cable may also crack allowing water to migrate into the insulation causing an electrical failure. The problem occurs predominantly in rocky cottage locations, where it can expose the public to voltage hazards at the shoreline.

The cables to be repaired or replaced are identified during line patrols and through outage monitoring. The locations are normally identified at least a year in advance of the work being completed, allowing adequate time for planning. The cable sections proposed for replacement are prioritized based either on the condition of the armor wire where exposed at the shoreline, or based on the historical failure rate.

It is more cost effective to splice in new sections of cable at the shoreline where the damage to the cable has occurred rather than replace the entire cable. Splicing in new sections of replacement cable reinstates the mechanical protection required to protect the cable from ice and public interference. An entire cable is replaced when it reaches end-of-life, as determined by the number of failures the cable has experienced, and the length of corroded or missing neutral.

**Results:**

- Address end of life Submarine Cables.
- Maintain customer reliability with reduced outage frequency and duration.
- Eliminate known safety hazards to the public associated with damaged submarine cables.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.3
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	<b>1.5</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>1.3</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Havelock TS 57M1 Feeder Refurbishment

**Investment Driver:** DC 107**Reference#:** S11**Investment Name:** Havelock TS 57M1 Feeder Refurbishment**InService:** December, 2008**Need:**

This investment is required to address the end-of-life condition of poles, crossarms and insulators on the 44 kV Havelock TS 57M1 Feeder, specifically the 3.2 km line section south of Bancroft DS.

Not proceeding with this investment risks prolonged outages, reliability issues, and increased public and employee safety risks due to the likelihood of wood pole and component failures.

**Investment Summary:**

This investment identifies section refurbishment work that is required on the Havelock TS 57M1 feeder line section located in the Bancroft area. This is a radial feeder, roughly 90 km in length that supplies about 7,500 customers with a winter peak load of roughly 15 MVA. Annual load growth is expected to be in the 1% to 1.5 % range over the planning period.

In 2003, an asset condition assessment of this feeder indicated that 23 km of the line section between Eels Lake RS and Bancroft DS had reached end-of-life. The poles in this line section are of 1948 vintage. The plan was to re-establish this section in phases, from 2004 to 2008, as a new 44 kV circuit on road allowance underbuilt with a rural 12.48 kV circuit. Poor feeder performance (long outages) stems from the fact that the section of feeder proposed for relocation is in poor condition and is difficult to access.

By the end of 2007, about 20 km of line section will have been addressed. The investment of \$2.1M in 2008 is required to complete the final 3 km of rehabilitation of this feeder.

**Results:**

- Maintain system security and customer delivery reliability.
- Improved accessibility and outage response time.
- Reduce safety hazards to the public and employees by replacing end of life components.
- Replace end of life components to comply with regulatory requirements.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	2.1
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	<b>2.3</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>2.1</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Kingsville TS M3 & M6 Feeder Refurbishment

**Investment Driver:** DC107**Reference #:** S12**Investment Name:** Kingsville TS M3 & M6 Refurbishment**In-Service:** December, 2008**Need:**

This investment is required for section refurbishment work on the Kingsville TS 27.6 kV M3 and M6 feeders.

Not proceeding with this investment risks prolonged outages, reliability issues, and increased public and employee safety risks due to the likelihood of wood pole and component failures.

**Investment Summary:**

These are radial feeders that together supply about 7,000 Hydro One Distribution, Chatham-Kent Hydro, and Essex Power customers. The M3 feeder supplies about 2500 Hydro One customers and embedded distributor – Chatham-Kent Hydro. The M6 feeder is used almost exclusively to supply embedded distributor Essex Power. Both feeders have a history of poor performance in terms of both outage duration and frequency. Annual load growth is expected to be about 1.5% over the planning period.

The M3 and M6 feeders supply over 40 MW of load with limited back-up supply during the peak summer months. This investment is required to address the end-of-life condition of poles and cross-arms on the two 27.6 kV feeders.

The main line section to be addressed is the 5 km M3/M6 double-circuit line section between Town Line Road (near switch B99X) and Hwy 77 (north of the former Town of Leamington). The other section to be addressed is the 2.5 km single-circuit M3 line section from Hwy 77 to Wheatley RS. Both line sections are within a high lightning strike area.

An asset condition assessment of the line sections has been completed, indicating that 130 poles should be replaced due to inadequate pole height and end-of-life pole condition.

The plan is to complete 130 pole replacements, addressing pole condition and correct clearance deficiencies. In addition, lightning protection will be installed in those sections where pole replacements are being completed.

**Results:**

- Maintain system security and customer delivery reliability by replacing end of life components.
- Improve feeder lightning performance in a high lightning strike area.
- Reduce potential safety hazards to the public and Hydro One employees by replacing end of life components
- Replace end of life components to comply with regulatory requirements.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets (A)	1.5
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	<b>1.7</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>1.5</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution– Investment Justification Lindsay TS D4M7 Phase 4 of 5

**Investment Driver:** DC107**Reference #:** S13**Investment Name:** Lindsay TS D4M7 Phase 4 of 5**In-Service Date:** December, 2008**Need:**

This investment is required to address the end-of-life condition of poles and crossarms on the 44 kV Lindsay TS D4M7 feeder; specifically the 3.7 km line section between Bulmer's Road and Fairburn Road, in the Fenelon Falls area.

Not proceeding with this investment risks prolonged outages, reliability issues and increased public and employee safety risks due to continuing feeder deterioration.

**Investment Summary:**

This investment consists of section refurbishment work that is required on the Lindsay TS D4M7 feeder. This is a 36 km long line supplying approximately 4,200 customers. Annual load growth is expected to be in the 1% to 1.5% range over the planning period. The section proposed for rehabilitation is more than 50 years old.

An Asset Condition Assessment study of this feeder and other rural feeders in the area has been completed. Findings of this study identified that about 65% of the poles on the 16.5 km line section between Bobcaygeon Duke DS and Switch D406-2 have reached, or are very near to end-of-life. The study also revealed that the neighbouring F1 and F2 rural feeders, located on the road allowance would require refurbishment within the next 5-10 years.

In order to address these issues, a number of possible alternatives were analysed and compared. The preferred plan is to relocate the entire 16.5 km section of feeder onto road allowance in the same location as the rural feeders also nearing end-of-life, and in the process transfer the rural feeders onto the new 44 kV structures. This solution would address both component end-of-life and improve reliability by providing improved access to the 44 kV feeder by relocation to road allowance from off-road.

This is the fourth phase of a five year plan. Under this phase, a 3.7 km section of new line will be built, with provisions for underbuild circuits (rural and Joint Use) from Bulmer's Road to Fairburn Road.

An investment of \$1.2 million is required to complete Phase 4 of 5 phases to rehabilitate this feeder.

**Results:**

- Replace end-of-life assets to comply with regulatory requirements.
- Address public and employee safety risks by replacing end of life assets.
- Improved customer reliability by relocation from off road to road allowance and by replacing end of life assets.
- Reduce vegetation management costs by relocating onto road allowance.
- A reduction of losses of 3.1 kW during peak periods.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.2
Operations, Maintenance & Administration and Removals (B)	0.1
<b>Gross Investment Cost (A+B)</b>	<b>1.3</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>1.2</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Longlac TS M1 Feeder Refurbishment

**Investment Driver:** DC 107

**Reference #:** S14

**Investment Name:** Longlac M1 Feeder Refurbishment

**In-Service:** Dec, 2008

**Need:**

This investment is required to address the end-of-life condition of poles, crossarms and insulators on the 44 kV Longlac S M1 Feeder, specifically the 4.3 km section starting at Longlac West DS to Picnic Point Road.

Not proceeding with this investment risks prolonged outages, reliability issues, and increased public and employee safety risks due to the likelihood of wood pole and component failures.

**Investment Summary:**

This investment is part of a multi-year plan started in 2003 to refurbish a 22 km section of Hydro One Distribution’s Longlac TS 16M1 feeder. The Longlac TS 16M1 feeder is a 44 kV circuit supplying all load east of Geraldton including the town of Longlac and the area’s lumber industry. This feeder is a radial supply to this area, with a main trunk roughly 36 km in length and approximately 50 years old. This feeder supplies about 1,220 customers with a winter peak load of roughly 18.3 MVA. Load growth is expected to be between 1% and 4%, with the likely need for a 2<sup>nd</sup> 44 kV circuit by 2014.

An ACA study of the feeder identified that the majority of poles had components that had reached end of life. In the past several years the town of Longlac had experienced several long duration outages, primarily related to end of life crossarm and insulator failures that needed to be addressed. A number of alternatives were considered in determining the most cost effective solution to provide an acceptable level of security to customers and replace end of life, or near end of life components. The alternative selected was to rebuild the entire 22 km line section in poor condition and re-establish the feeder as a new 44 kV circuit with a rural underbuilt 7.2/12.48 kV circuit, as well as provisions for a future 2<sup>nd</sup> 44 kV circuit.

This investment represents the final 4.3 km on the main line of the Longlac TS M1 feeder to be rehabilitated.

**Results:**

- Maintain system security and customer delivery reliability by replacing end of life assets.
- Reduce potential safety hazards to the public and Hydro One employees.
- Replace end of life components to comply with regulatory requirements.
- A reduction in line losses of 10 kW at peak periods.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets (A)	1.1
Operations, Maintenance & Administration and Removals (B)	0.1
<b>Gross Investment Cost (A+B)</b>	<b>1.2</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>1.1</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Minden TS 87M1 Phase 3 of 4

**Investment Driver:** DC 107**Reference #:** S15**Investment Name:** Minden TS 87M1 – Phase 3 of 4**In-Service:** December 2008**Need:**

This investment is required to address the end-of-life condition of poles, crossarms and insulators on the 44 kV Minden TS 87M1 Feeder, specifically 4.5 km of the line section between Haliburton and Tory Hill, located in the Minden area.

Not proceeding with this investment risks continued prolonged outages, reliability issues, and safety concerns for the public and employees.

**Investment Summary:**

This investment identifies refurbishment work that is required on a section of the Minden TS 87M1 feeder located in the Minden area. This radial feed, roughly 40 km in length, supplies about 5,000 customers with a peak load of roughly 10 MVA. Annual load growth is expected to be in the 1% to 1.5 % range over the planning period.

An assessment of the condition of the line has indicated that 11 km of the 24 km line section between Haliburton DS and Tory Hill DS has reached end-of-life. The poles in this line section have tested poorly, with the majority identified as substandard.

After assessing alternatives, it was identified that the preferred plan was to re-establish this section as a new 44 kV circuit on road allowance with a rural 12.48 kV underbuild circuit, in phases, over a number of years. Poor feeder performance stems from the fact that the section of feeder proposed for relocation is in poor condition and is difficult to access, being located in extremely rugged terrain.

A cost of \$2.0M is required to complete phase 3 of 4 for the rehabilitation of this feeder. The remaining 2.5 km of new overhead line section will be completed in phase 4.

**Results:**

- Improve system security and customer delivery reliability by replacing end of life components
- Improved accessibility and outage response time.
- Reduce potential safety hazards to the public and Hydro One employees.
- Replace end of life components to comply with regulatory requirements.
- Reduce vegetation management costs by relocating onto road allowance.
- A reduction in line losses of 28 kW.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets	2.0
Operations, Maintenance & Administration and Removals	0.2
<b>Gross Investment Cost</b>	<b>2.2</b>
Recoverable	0
<b>Net Investment Cost</b>	<b>2.0</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Town of Thessalon Rebuild – Part 2 of 4

**Investment Driver:** DC107

**Reference #:** S16

**Investment Name:** Town of Thessalon Rebuild – Part 2 of 4

**In-Service:** December, 2008

**Need:**

This investment is required to address the end-of-life condition of poles, conductor, and associated overhead line components operating at 2.4 kV in the Town of Thessalon.

Not proceeding with this investment would present reliability and safety risks to residents of Thessalon associated with overhead line assets that are at end of life.

**Investment Summary:**

The Town of Thessalon is an acquired Municipal Electric Utility that has a 2.4 kV delta distribution network supplied from two 25kV/2.4 kV Distribution Stations with a total load of about 4.0 MVA.

An ACA has concluded that the majority of the 2.4 kV system in Thessalon is at end-of-life and in need of replacement. Specifically;

- more than 50% of the poles are at end-of-life.
- there are numerous sections of frayed and/or “suspect” conductor.
- numerous instances of substandard clearances, including clearances to joint-use tenants and street lights.
- substandard conductor ground clearances.

In addition, an ungrounded 2.4 kV delta distribution network is not a common North American electric utility installation. Hydro One Distribution Standards do not cover a 2.4 kV delta system, and as such there are no approved work methods, materials, or construction standards for this system.

A review of the options for addressing the end-of-life assets and non-standard system in Thessalon concluded that the preferred alternative is to re-build the Town’s distribution network and convert it to 25/14.4 kV operation in four stages. This voltage is consistent with the existing Hydro One Distribution system supplying the area around Thessalon. Completion of this work will allow the elimination of two Distribution Stations.

Phase 1 of this plan will be completed in 2007. This investment covers phase 2 of the recommended plan.

**Results:**

- Replace end-of-life distribution line assets and bring the distribution network in the Town of Thessalon up to present-day Hydro One Distribution Standards.
- Mitigate reliability and safety risks associated with end-of-life distribution line assets.
- Replace end of life assets to comply with regulatory requirements.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets	1.3
Operations, Maintenance & Administration and Removals	0.2
<b>Gross Investment Cost</b>	<b>1.5</b>
Recoverable	-
<b>Net Investment Cost</b>	<b>1.3</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Fort Frances TS M1 Feeder Rehab Phase 3

**Investment Driver:** DC107

**Reference #:** S17

**Investment Name:** Fort Frances TS M1 Rehab

**In-Service:** December, 2008

**Need:**

This investment is required to address the end-of-life condition of poles and crossarms on the 44 kV Fort Frances TS M1 feeder, specifically the 14 km line section between Straton and Pinewood.

Not proceeding with this investment risks prolonged outages, reliability issues, and leads to continuing feeder deterioration.

**Investment Summary:**

Hydro One Distribution's Fort Frances 22M1 feeder is a 44kV line emanating from Fort Frances TS that feeds 7 Hydro One Distribution stations as well as a major customer, Abitibi Paper. It supplies the communities that are situated along the Rainy River west from Fort Frances.

This investment is the third phase of a multi-year plan that includes refurbishment work on a 14 km line section of the Fort Frances TS M1 between Straton and Pine River DS. The M1 feeder is a 94 km long line supplying approximately 3,500 customers. Annual load growth is expected to be less than 1% over the planning period.

An Asset Condition Assessment study of this feeder has been completed. Findings of this study identified that there is a need to address deteriorated line sections of this feeder. The sections proposed for rehabilitation are 50 plus years old and represent about 30% of the total feeder length. The preferred plan is to rehabilitate the feeder over a number of years, replacing poles and insulators, but not the conductor. The conductor is adequate to meet future customer load requirements and has a remaining life of at least 20 years. This solution would address both component end-of-life and the reliability issues.

**Results:**

- Improved customer reliability and address safety issues by replacing end of life components
- Replace end-of-life assets to comply with regulatory requirements.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets	1.8
Operations, Maintenance & Administration and Removals	0.2
<b>Gross Investment Cost</b>	<b>2.0</b>
Recoverable	-
<b>Net Investment Cost</b>	<b>1.8</b>

\*Includes overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution - Investment Justification Metering for Shared Use Distribution Charges

**Investment Driver:** DC109

**Reference #:** S18

**Investment Name:** Metering for Shared Use Distribution Charges

**In-Service Date:** December 2008

**Need:**

This investment is required for metering which is used to determine Local Distribution Companies' (LDCs') shared use of Hydro One owned distribution stations.

**Investment Summary:**

In situations where LDCs consume power at Hydro One owned distribution stations, the LDC's energy consumption is measured, to allow the determination of the LDC's shared use of the distribution station. The 2008 spending will install new meters at 20 sites at the cost of approximately \$0.1 million at each location.

**Results:**

- Charge the approved OEB Shared Use Distribution Charge to those LDCs using Hydro One distribution stations.
- Recover the capital cost of the investment through the application of the approved OEB rate.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	2.0
Operations, Maintenance & Administration and Removals (B)	-
<b>Gross Investment Cost (A+B)</b>	<b>2.0</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>2.0</b>

\*Includes Overhead and Allowance for Funds Used during Construction at current rates

## Hydro One Distribution – Investment Justification Smart Metering - 2008

**Investment Driver:** CC851

**Reference #:** S19

**Investment Name:** Smart Metering  
**January, 2010**  
**Need:**

**In-Service:**

The Provincial Government has mandated the installation of smart meters in 800,000 homes by 2008 and installations in all homes by 2010. These meters must be capable of being read daily and of providing energy consumption data to the customer by the next business day. This investment is required to meet these requirements.

Provincial regulations provide the authorization for Hydro One Distribution to proceed with this initiative.

### **Investment Summary:**

Meeting this mandate requires a new communication/IT infrastructure that encompasses Advanced Metering Infrastructure ("AMI") capable electronic meters, supporting telecommunications, back office integration and business process re-design, customer information system ("CIS") upgrades and other supporting IT software/hardware systems.

Hydro One will rely on the IESO as the Data Company (DataCo) appointed by the Ontario Ministry of Energy to provide the meter data management/repository ("MDM/R") functionality. Accordingly, no costs have been included in Hydro One's plan for the processing and storage of consumers' consumption information and data received from other LDCs. Only expenditures required to interface between Hydro One's AMI system and the MDM/R and the MDMR and Hydro One's CIS have been included.

Hydro One is accountable for owning and installing the smart meters ("AMCD"), collecting customer metering data over a telecommunications network ("AMRC" and "WAN") to a computer application ("AMCC"), and passing the data to DataCo's data warehouse, and receiving the data back for customer billing purposes.

Hydro One Networks Distribution Business' share of the Provincial target is forecast to be about 1.3 million meter installations by 2010, with about 240,000 installations by 2008. The company is on track to meet these targets.

This project carries risks. Smart meters are a relatively new technology without significant deployment to date. Evolving directions regarding specifications, accountabilities and timelines also remain a risk. For example, until a smart meter entity (SME) -- the data warehouse that is inserted in the middle of the meter-to-bill process -- is created, and plans developed, Hydro One cannot finalize its plan to integrate its AMR to provide hourly data or develop TOU billing capability. It has done extensive work to identify these risks and mitigate them to the extent possible, however.

Capital expenditures in 2008 will be focused on:

- The installation of additional smart meters and related advanced metering communications devices ("AMCDs");
- Building and expanding the advanced metering regional collector ("AMRC") and underlying networks to accommodate an increasing number of meters coming on-stream;
- Commissioning and placing into service, hardware and software for the AMCC to enable it to communicate and transmit quality meter data to/from the MDM/R and the company's CIS
- Upgrades to our CIS system to provide for TOU billing and related required settlement changes
- Integration of the end to end systems including business process redesign, and
- Project management and the expertise required to accomplish the above tasks.

Operating expenditures in 2008 will be focused on:

- Maintaining and operating hardware, software and software licenses associated with the AMCC;
- Telecommunication charges associated with operating the LANs and WAN;
- Maintaining smart meters that have been placed into service;

July, 2007

- Managing, developing and implementing business process redesign, change management (including staff training) and customer communication related work; and
- Responding to higher customer inquiries pre- and post-installation of smart meters on customer premises.

**Results:**

- 370,000 incremental meter installations in 2008 (for a total of 610,000).
- Communications network required to support the installed meters, also in place.
- Core systems modified/built to support limited commencement of time of use billing.
- Business processes re-engineered to support smart metering.
- Limited cost savings in the areas of meter reading, meter sampling and reverification.

**Costs:**

	<b>2008(\$M)</b>
Capital* and Minor Fixed Assets (A)	164.8
Operations, Maintenance & Administration and Removals (B)	9.7
<b>Gross Investment Cost (A+B)</b>	<b>174.5</b>
Recoverable (C)	-
<b>Net Capital Cost (A+C)</b>	<b>164.8</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification New Connections, Upgrades and Service Cancellations - 2008

**Investment Driver:** DC201

**Reference #:** D1

**Investment Name:** New Connections, Upgrades and Service Cancellations

**In-Service:** December, 2008

**Need:**

These investments are required to meet the on-going demand to connect new customers to Hydro One Distribution's network, upgrade services of existing customers, and the cancellation of service.

Not proceeding with these investments would result in non-compliance with Distribution license requirements and with obligations under the Distribution System Code. This work is therefore a regulatory requirement.

**Investment Summary:**

Each year, Hydro One Distribution connects new customers to the distribution network, upgrades services for existing customers and removes facilities when customers cancel services.

As part of the obligations in Hydro One's electricity distribution license and the distributor's responsibilities in the Distribution System Code (DSC), Hydro One Distribution is required to make an offer to connect all distribution customers on a non-discriminatory basis, upon written request for connection.

A service upgrade occurs when a customer requires a larger service entrance. A service upgrade normally requires the preparation of a service layout and replacement of secondary service wires. Transformers may also have to be upgraded, meters replaced and possibly additional transformation installed.

For cancellations of existing service, Hydro One Distribution is required to remove the idle assets (transformers, poles, service wires, meters, etc.) for safety and security reasons. The cost for this work is charged to depreciation, where most other costs associated with new connections and upgrades are capitalized.

Individual investments within these programs are managed on a project basis. Projects include design (service layouts), labour, material and other costs associated with actual physical connection or removal.

A standard connection consisting of a service layout, overhead transformation, 30 m of overhead conductor, and standard retail metering (including smart meters) is provided free of charge to new customers that "lie along" the existing network, as per the DSC requirements. For customers that require expansion of the network in order to be connected, a discounted cash-flow calculation is used to determine customer contributions. The capital contribution is based on any shortfall between future revenues and the cost of connection, network expansion and reinforcement. Customer contributions for system expansions, plus other recoverable costs beyond the standard connection, are forecast at \$23.7M for the year.

Projected cost for these programs are primarily based on historic demand and forecast load growth that takes into consideration the Ontario Gross Domestic Product and Ontario Building Permits.

**Results:**

- Connect new customers.
- Upgrade the services of existing customers.
- Remove assets when services are cancelled.
- Satisfy the requirements of the Distribution System Code and Distribution License.

**Costs:**

	<b>2008(\$M)</b>
Capital* and Minor Fixed Assets (A)	127.6
Operations, Maintenance & Administration and Removals (B)	6.7
<b>Gross Investment Cost (A+B)</b>	<b>134.3</b>
Recoverable (C)	(23.7)
<b>Net Capital Cost (A+C)</b>	<b>103.9</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification 2008 Demand Investments

**Investment Driver:** DC202

**Reference #:** D2

**Investment Name:** 2008 Demand Investments

**In Service:** December 2008

**Need:**

This investment is required to provide a capability for the Customer Operations' function to resolve lower cost critical issues identified by customers or system impact assessments on a short lead-time basis.

Not proceeding with this investment would result in deteriorated service reliability and quality causing decreased customer satisfaction and substandard supply. Damage to distribution system assets could result.

**Investment Summary:**

Minor distribution system modifications are required to address system needs identified by customer power quality complaints, reliability concerns, system impact assessments and customer connection requests. Responding to these needs ensures an adequate supply of electricity to customers.

Technical criteria are used in assessing system/customer needs. Minor system modifications/betterments addressed by this plan include items such as protection coordination, and installing new equipment or equipment upgrades. Modifications that will cost over \$0.1M are assessed individually and are subject to a separate approval.

**Results:**

- Maintain reliability and quality of service within supply standards.
- Address customer and reliability issues in an expedient manner.

**Cost:**

	2008(\$M)
Capital* and Minor Fixed Assets (A)	1.1
Operations, Maintenance & Administration and Removals (B)	0.1
<b>Gross Investment Cost (A+B)</b>	<b>1.2</b>
Recoverable (C)	-
<b>Net Capital Cost (A+C)</b>	<b>1.1</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Subtransmission Feeder Sectionalizing - 2008

Investment Driver: DC202

Reference #: D3

Investment Name: Subtransmission Feeder Sectionalizing

In-Service : December, 2008

**Need:**

This investment is required to achieve a corporate goal to move Hydro One Distribution reliability to upper-quartile.

If this investment is cancelled, customers would not receive the benefits of improved reliability on the worst performing subtransmission feeders. As well, not proceeding with this investment would present customer and reputation risks as a result of not having targeted system modifications that cost effectively improve the reliability of supply to distribution customers.

**Investment Summary:**

Feeder sectionalizers automatically isolate a portion of the feeder for downstream faults, reducing the number of customers affected. Subtransmission feeders (27.6 kV & 44 kV feeders supplied from Transformer Stations (TSs)) offer the greatest opportunities to improve reliability since they supply large amounts of load, and historically have not employed automatic sectionalizing for faults. Since 2005, the approved Business Plan has included funding for installing mid-feeder sectionalizers on the worst performing feeders over the period 2005-2007. The program has been extended to 2008 to complete the program, as not all feeders were completed during the 2005 to 2007 period due to the need to complete other higher priority work.

This investment is to provide mid-feeder sectionalizing on 32 subtransmission feeders in 2008, bringing the total number of feeders provided with sectionalizing to 86, with 30 feeders completed in 2005-2006 and 24 planned for 2007. The feeders have been selected based on having the highest number of customer interruptions and interruption hours (highest contributions to provincial SAIDI & SAIFI), plus the suitability for sectionalizer application.

This investment represents the final phase of the provincial program to install subtransmission feeder sectionalizing on the poorest performing subtransmission feeders.

**Results:**

- Individual sub-transmission feeders will see customer outages and outage durations reduced on average by about 25%.
- Feeder sectionalizing will improve reliability. On average, this investment will reduce provincial SAIFI and SAIDI by 1.5% and 1.8% respectively bringing the total expected improvement at the end of the program to 4.5% and 5.5% respectively.

**Costs:**

	2008(\$M)
Capital* and Minor Fixed Assets (A)	2.2
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	<b>2.4</b>
Recoverable (C)	-
<b>Net Capital Cost (A+C)</b>	<b>2.2</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Armitage TS M12 Feeder Extension

**Investment Driver:** DC202

**Reference #:** D4

**Investment Name:** Armitage TS M12 Feeder Extension

**In Service:** June 1, 2008

**Need:**

This investment is required to provide adequate 44 kV feeder capacity in the southern area of Whitchurch-Stouffville.

Not proceeding with this investment would lead to overloaded assets and the inability to serve new load presenting reliability, customer, regulatory and reputation risks as a result.

**Investment Summary:**

Whitchurch-Stouffville is a high-growth suburban community north of the City of Markham. Significant load growth is occurring in the southern part of the town, including several large commercial loads. The expected growth rate is 3.2 % per year. The existing 44 kV feeders in the area are unable to supply the additional load.

Two existing 44 kV feeders supplying the southern part of Whitchurch-Stouffville had exceeded their planning criteria in 2006. The situation is expected to worsen as additional load is added.

Various alternatives were analyzed and compared to address the situation. The preferred plan is to extend Armitage TS M12 by 6km and reconfigure it to supply the southern part of the town and relieve existing feeders. The work is consistent with the feeder development recommendations of the Whitchurch-Stouffville supply study.

**Results:**

- Provide adequate 44 kV feeder capacity to supply southern Whitchurch-Stouffville.
- Relieve overloaded feeders.
- Line losses will be reduced by 740 kW.
- Implement a cost effective life cycle plan.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.7
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	1.9
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	1.7

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Holland Junction TS Feeder Development

Investment Driver: DC202

Reference #: D5

Investment Name: Holland Junction TS Feeder Development

In-Service: December, 2008

**Need:**

This investment is required to provide adequate 44 kV feeder capacity in northern York Region.

Not proceeding with this investment would lead to overloaded assets and the inability to serve new load presenting reliability, customer, regulatory and reputation risks as a result.

**Investment Summary:**

Northern York Region, including the areas of Newmarket, Aurora, Bradford, East Gwillimbury and Whitchurch-Stouffville, is largely supplied from Armitage TS. Significant load growth is occurring in all of these areas due to increases in population as well as commercial and industrial developments. The load growth for the Hydro One Distribution area is expected to be 3.1 % per year for the next several years.

Armitage TS has exceeded its LTR rating and requires relief. Hydro One Networks has been directed by the Ontario Energy Board to construct a new transformer station in the vicinity of Holland Junction in King Township. The anticipated in-service date for the transformer station is prior to the 2009 summer peak.

Various alternatives were analyzed and compared to address the situation. The preferred plan is for Hydro One Distribution and Newmarket Hydro to each construct four 44kV feeders from the new TS. This project is for Hydro One Distribution to construct two 44 kV feeders from Holland Junction TS to Hwy 11.

**Results:**

- Transfer load from Armitage TS to Holland Junction TS.
- Provide adequate 44 kV feeder capacity to supply Northern York Region at least cost.
- Line losses will be reduced by 74kW
- Implement life cost cycle plan

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	2.8
Operations, Maintenance & Administration and Removals (B)	0.3
<b>Gross Investment Cost (A+B)</b>	3.1
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	2.8

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Curve Inn DS new T2 and feeder

**Investment Driver:** DC202

**Reference #:** D6

**Investment Name:** Curve Inn DS T2 and Feeder

**In Service:** December, 2008

**Need:**

This investment is required to provide adequate 27.6 kV transformation capability in the southwestern part of the Municipality of Clarington.

Not proceeding with this investment would present reliability, customer, reputation and regulatory risks as the result of overloading assets

**Investment Summary:**

The southwestern part of the Municipality of Clarington is a high-growth suburban area adjacent to City of Oshawa. Significant load growth is occurring in this area, including several large commercial and residential developments. The existing facilities in the area are unable to supply the additional load.

The load growth in Clarington southwest is projected to be 3.8% per year for the next 5 years. The areas are largely supplied by Park Road DS which has a station capacity of 35.7MVA. This capacity will be exceeded in year 2008 when the load on the station is expected to reach 36.8MVA.

Various alternatives were analyzed and compared to address the situation. The preferred plan is to add a new 12 MVA transformer at the existing Curve Inn DS and provide load relief to Park Road DS by transferring Wilmot Creek community load to Curve Inn DS. This investment will address the growing loads in the Municipality of Clarington for the next 5 years, The load relief will also improve the supply reliability to the Wilmot Creek community, as the new feeder will be about 5 km shorter.

**Results:**

- Provide additional transformation capability.
- Relieve overloading of Park Road DS.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets (A)	2.7
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	2.9
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	2.7

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Gardiner TS II 44 kV Feeders

**Investment Driver:** DC202**Reference #:** D7**Investment Name:** Gardiner TS II – 44 kV Feeders**In Service:** June 2008**Need:**

This investment is required to relieve loading on Gardiner TS and Frontenac TS that supply Hydro One Distribution. Transferring load to a new TS is the least cost option for maintaining adequate capacity and supply reliability.

Not proceeding with this investment would result in an inability to relieve the existing overloaded Gardiner TS and Frontenac TS thereby resulting in decreased customer satisfaction and substandard quality of supply.

**Investment Summary:**

Based on the results of system studies and an analysis of alternatives, the preferred solution is the construction of a new transformer station (Gardiner TS II) on the site of the existing Gardiner TS. This will require Hydro One Distribution to build new feeder egresses from 3-44 kV feeder positions. This will enable Gardiner TS and Frontenac TS loads to be reduced below their rating (136.6 MVA and 105.9 MVA respectively) for at least the next 10 years.

This investment funds a capital contribution to Hydro One Transmission as stipulated in the Transmission System Code for building the new TS in the amount of \$1.0 million, as well as the cost of installing IESO compliant metering at a cost of \$0.3 million.

**Results:**

- Provide adequate transformation capacity to supply Hydro One Distribution's load growth.
- Optimize transformer and feeder utilization and balance by transferring load to the new TS.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.3
Operations, Maintenance & Administration and Removals (B)	-
<b>Gross Investment Cost (A+B)</b>	1.3
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	1.3

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification

### Brockville Area Upgrade

**Investment Driver:** DC202

**Reference #:** D8

**Investment Name:** Brockville Area Upgrade

**In Service:** December 2008

**Need:**

This investment is required to meet growing loads in the Brockville area, ensure that system protection criteria are met, and address failed distribution system components.

Not doing the proposed work will lead to overloading of feeders, inability to serve additional loads in some parts of the municipality, increasing customer dissatisfaction with power quality, reducing the ability to provide timely service restoration following outages, risk that system protection criteria are not being met and reducing reliability.

**Investment Summary:**

The Brockville “City” area requires supply capacity reconfiguration at the distribution voltage level. Distribution customers are supplied either directly at 44 kV from the transformer station, or at 4.16 or 8.32 kV from distribution stations. An assessment of the supply to Brockville shows heavy/imbalanced feeder loading and aged/failed underground conductors have been identified. One 44 kV line is loaded beyond Hydro One’s planning criteria (loading is 27 MVA compared to 25 MVA which initiates a capability review).

Limited capability to supply new loads or provide satisfactory outage restoration exists. Brockville’s total load is 61 MVA with 1.5% growth.

This investment will improve feeder loading and balance, provide improved alternate supply capability, and satisfy the need to ensure that distribution protection criteria are observed. Failed distribution system components will be replaced and upgraded to be capable of handling future demands. System protection will be reviewed and modified as required on the eight DSs in the Brockville area to ensure safe and reliable operation of the system.

**Results:**

- Distribution Station and feeder capacity will be adequate to serve loads in Brockville over the next 5 to 10 years.
- Voltage and power quality will be within CSA and industry standards.
- Deterioration of reliability will be avoided.
- Due diligence regarding protection settings will be satisfied.
- Losses will be reduced by 30 kW.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	2.2
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	2.4
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	2.2

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Ingersoll North DS Voltage Conversion

**Investment Driver:** DC202

**Reference #:** D9

**Investment Name:** Ingersoll North DS Voltage Conversion

**In Service:** December, 2008

**Need:**

This investment is needed to address end-of-life conditions at the 27.6/8.32 kV Ingersoll North DS, and to supply forecast new loads in the Hwy. 19 & Hwy. 401 area near Ingersoll.

Not proceeding with this investment would present customer, regulatory and reputation risks as a result of deteriorating performance of assets that are at end-of-life, and insufficient system capacity for forecast loads.

**Investment Summary:**

Ingersoll North DS is a 3.6 MVA, 27.6/8.32 kV station that currently supplies 3.2 MVA of load via a 8.32 kV feeder (the F2 feeder). The station is 55 years old and has been deemed to be at end-of-life based on a detailed condition assessment. The F2 feeder supplies load along Hwy. 19 south of Ingersoll towards Hwy. 401 and then the surrounding rural areas to the south of the Hwy 401. Along Hwy. 19, two developments are planned, a new residential subdivision and a new auto parts plant. Both developments will "lie-along" the existing F2 feeder.

To address the end-of-life conditions at Ingersoll North DS, as well as supply the new load connections in the area, the preferred plan is to eliminate Ingersoll North DS through a combination of 27.6/16 kV voltage conversion and the installation of step-down transformers at strategic locations. In order to achieve this, a new metered 27.6/16 kV Supply Point is required, and approximately 25 km of insulation upgrades, protection changes and removals are required.

**Results:**

- Replace DS assets that are at end-of-life.
- Provide sufficient distribution feeder capacity to serve forecast new loads along Hwy. 19, south of Ingersoll.
- Reduce peak Line Losses by 130 kW.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.9
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	2.1
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	1.9

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Kleinburg TS Feeders to Bolton

Investment Driver: DC202

Reference #: D10

Investment Name: New Kleinburg TS Feeders to Bolton

In Service: December, 2008

**Need:**

This investment is required to provide adequate 44 kV and 27.6kV feeder capacity in the Bolton area.

Not proceeding with this investment will continue to present reliability, customer, regulatory and reputation risks as a result of overloaded assets.

**Investment Summary:**

Bolton is a high-growth suburban community in the town of Caledon, north of Brampton and west of the City of Vaughan. Bolton is experiencing significant load growth that includes several large commercial and industrial developments. The expected growth rate is 3.3 % per year. The existing 27.6 kV and 44 kV feeders in the area are unable to supply the additional future load.

Two existing 44 kV feeders and three 27.6kV feeders supplying the Bolton area exceeded their planning criteria in 2006. The situation is expected to worsen as additional load is added.

Various alternatives were analyzed and compared to address the situation. The preferred plan is to build two new feeders, one 44 kV and one 27.6 kV from Kleinburg TS for about 12 km on the same pole line and reconfigure the supply in the northern part of Bolton, thereby relieving the existing overloaded feeders.

**Results:**

- Provide adequate 44 kV and 27.6 kV feeder capacity to supply Bolton area.
- Line losses will be reduced by 47 kW.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	3.6
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	<b>3.8</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>3.6</b>

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Networks – Investment Justification

### Belle River TS M2 Feeder to Haycroft DS

**Investment Driver:** DC202**Reference #:** D11**Investment Name:** Belle River TS M2 Line to Haycroft DS**In Service:** December, 2008**Need:**

This investment is needed to address the overloading of 115/27.6 kV Tilbury West HV DS.

Not proceeding with this investment would present customer, reliability, regulatory and reputation risks as the result of overloading assets.

**Investment Summary:**

Tilbury West HV DS supplies the Town of Tilbury (Chatham-Kent Hydro service territory) and the Hydro One service territory surrounding the town. The Town of Tilbury is located along Hwy 401 about 45 km east of the City of Windsor.

Tilbury West HV DS is a 15/25 MVA 115/27.6 kV station. Load in the HV DS exceeds its rated capacity by 3 MVA. The preferred (least cost) plan to transfer part of the station's load on to the new Belle River TS was placed into service in May 2006.

This investment covers the extension of the Belle River TS M2 feeder by about 7.5 km to Haycroft DS. Haycroft DS will be transferred from the Tilbury West HV DS F1 feeder to the Belle River TS M2 feeder, thereby reducing the load on Tilbury West HV DS to within acceptable standards.

**Results:**

- Improve reliability by providing adequate load relief for Tilbury West HV DS for the next 10 years, at least cost.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	1.9
Operations, Maintenance & Administration and Removals (B)	0.1
<b>Gross Investment Cost (A+B)</b>	2.0
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	1.9

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Seaforth M5 27.6 kV, 25 MVA Voltage Regulation

Investment Driver: DC202

Reference #: **D12**

Investment Name: Seaforth M5 27.6 kV, 25 MVA Voltage Regulation

In-Service : December, 2008

**Need:**

This investment is required to maintain supply voltage within Distribution System Code requirements on the Seaforth M5 feeder.

Not proceeding with the proposed improvement will lead to unacceptably low voltage, inability to connect additional customers in some parts of the municipality and increasing customer dissatisfaction as a result of power quality issues.

**Investment Summary:**

As recent as November 2006, Festival Hydro identified a new customer (8-10 MVA ethanol plant) to be located within Festival Hydro's service area in the town of Hensal. The Town of Hensal is supplied from the Seaforth M5 feeder at 27.6kV and is approximately 22 km from Seaforth TS. The total line length is 25 km.

Load flow studies indicate that by 2008 that there will be substandard voltage starting at a point approximately half way along the feeder (12 km). Hydro One customers connected to the furthest 12 km and Festival Hydro (Town of Hensal) will experience low voltage if remedial action is not taken. This condition can be avoided with the installation of a new 27.6kV, 25 MVA regulator approximately 10 km from Seaforth TS.

Load in the area is expected to continue to grow at 1.5 % per year. The installation of a new regulator as proposed will ensure that voltage levels on the Seaforth M5 will remain within acceptable standards for a period of 5 years.

**Results:**

- Avoid substandard voltage problems when the new ethanol plant connects in 2008.
- Improve voltage regulation.
- Reduce line losses by 46 kW.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets (A)	1.4
Operations, Maintenance & Administration and Removals (B)	-
<b>Gross Investment Cost (A+B)</b>	1.4
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	1.4

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Stayner TS x Blue Mountain – Build 2 New 44 kV Feeders – Stage 1

Investment Driver: DC202

Reference #: D13

Investment Name: Stayner TS x Blue Mountain - Build 2 New 44 kV Feeders

In-Service: December, 2008

**Need:**

This investment is required to maintain acceptable supply conditions to customers in the Blue Mountain area, meet load growth in the area and avoid the risk of unsupplied load due to feeder loading beyond protection limits.

Not proceeding with this investment will result in substandard voltage and protection conditions on the existing 44 kV feeders supplying the Blue Mountain area.

**Investment Summary:**

Load in the Blue Mountain and Collingwood area is supplied at 44 kV from Meaford TS and Stayner TS. The two most heavily loaded feeders are the Meaford TS M1 at 37 MVA, and the Stayner TS M1 at 32 MVA. Load on these two feeders is expected to grow at a rate of 2-2 ½ % over the next several years due to new residential and tourist developments. By winter 2008/2009, the voltage at the end of both feeders is projected to be below CSA standard of 94% of nominal unless relief is provided.

In 2006, the OPA issued a report recommending that additional transmission capacity be provided to the Southern Georgian Bay area by converting Stayner TS from 115 kV to 230 kV and installing 230-115 kV auto-transformation at this location. The additional capacity at Stayner TS will consist of 75/125 MVA transformers replacing existing 50/83 's, plus 3 new 44 kV feeder positions.

This investment covers Stage 1 of a plan to extend two new 44 kV feeders from Stayner TS to the Blue Mountain area in order to relieve the existing Meaford TS M1 and Stayner TS M1 feeders. Stage 1 involves 10 km of new double-circuit 44 kV wood pole line, overbuilding existing rural distribution circuits, and connected to existing M1 & M3 feeders out of Stayner TS. A separate investment will be issued for Stage 2, for 2009 construction, which will extend the 2 new feeders to Stayner TS to co-incide with the in-service date of the station upgrade.

**Results:**

- Maintain supply conditions within CSA standards in the Blue Mountain area.
- Provide new feeders to utilize new transmission capacity at Stayner TS.

**Costs:**

	2008 (\$M)
Capital* and Minor Fixed Assets (A)	4.6
Operations, Maintenance & Administration and Removals (B)	0.5
<b>Gross Investment Cost (A+B)</b>	<b>5.1</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>4.6</b>

\*Includes overhead and Allocated Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Timmins TS M9 Feeder Extension

**Investment Driver:** DC202**Reference #:** D14**Investment Name:** Timmins TS M9 Feeder Extension**In-Service:** December, 2008**Need:**

This investment is needed to address forecast overloading of Hoyle DS. It also addresses replacement of 4 kV line assets that are nearing end-of-life and reduces system losses.

Not proceeding with this investment would present reliability, customer, regulatory and reputation risks as the result of overloading assets.

**Investment Summary:**

Customers located east & south-east of Timmins are supplied by Hoyle DS, a 115-27.6 kV HVDS. Hoyle DS is a single-bank station and as a result its' firm load capability is limited to the 115 kV Mobile Substation rating of 15 MVA. Hoyle DS is currently loaded at about 12 MVA and is forecast to increase to 18 MVA by the end of 2007 due to a number of new and re-developing mines being connected in this area.

Prior to the mid-1990's, a portion of the load supplied from Hoyle DS was fed from the Timmins TS M9 feeder. This load was transferred to Hoyle DS when construction of Placer Domes' open-pit gold mine forced the relocation of the roadway on which the M9 was located. A review of alternatives for addressing the forecast overloading of Hoyle DS has concluded that the preferred plan is to re-establish the M9 supply eastwards through South Porcupine and transfer load in this area from Hoyle DS to Timmins TS.

This project involves extending the Timmins TS M9 feeder for approximately 1.3 km through South Porcupine by converting the South Porcupine DS F2 feeder from 4.16 kV to 27.6 kV. An additional 2.5 km of associated single-phase line taps will also be converted from 2.4 kV to 16 kV and approximately 1800 KVA of load, or about half the total load on South Porcupine DS, will be converted to 27.6 kV. This work addresses near end-of-life condition of the existing 4 kV feeder, which will otherwise require replacement in about 5 years. Also included are 2 new 27.6 kV load break switches and a new 3-phase electronically-controlled unit.

**Results:**

- Relieve overloading of Hoyle DS to maintain customer supply.
- Replace near end-of-life 4 kV assets fed from South Porcupine DS.
- Reduce peak Line Losses by 200 kW.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets (A)	2.1
Operations, Maintenance & Administration and Removals (B)	0.2
<b>Gross Investment Cost (A+B)</b>	<b>2.3</b>
Recoverable (C)	-
<b>Net Investment Cost (A+C)</b>	<b>2.1</b>

\*Includes overhead and Allocated Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Timmins Moneta DS Voltage Conversion

**Investment Driver:** DC202**Reference #:** D15**Investment Name:** Timmins Moneta DS Voltage Conversion**In-Service:** December, 2009**Need:**

To address the condition of an existing 4.16 kV distribution station and associated line assets that are at, or approaching, end-of-life.

Not proceeding with this work will result in deterioration of existing station & line equipment resulting in supply interruptions, negative environmental impacts and the reduced safety for Hydro One staff and the general public.

**Investment Summary:**

Prior to 2003, load in the central core of the City of Timmins was supplied via a 4.16 kV distribution network fed from four 27.6-4.16 kV Distribution Stations – Pine DS, Ninth DS, Vimy DS #2, and Moneta DS. The total load on this system was 17 MVA, about 15% of the total load in the City. The remainder of the load in Timmins is supplied directly at 27.6/16 kV via feeders emanating from Timmins TS and Laforest Road and Hoyle high voltage distribution stations (HVDS).

A condition assessment was conducted on the entire 4.16 kV network in 2001 and 2002, which concluded that the four stations were in need of extensive rehabilitation work including new circuit breakers and associated control systems, plus replacement of most structural support components. In addition, an assessment of the associated 4.16 kV feeders fed from these stations concluded that 60-70 % of the existing wood poles are at end-of-life, and there are numerous instances of substandard primary and secondary conductor which are prone to mechanical failure and/or electrical overloading.

The preferred solution is to eliminate the existing 4.16 kV system through conversion of the operating voltage to 27.6 kV supplied directly from Timmins TS, over a multi-year period. Elimination of Timmins Pine DS, Ninth DS, and Vimy DS #2 was completed in 2003, 2004, and 2006 respectively.

This investment covers the work necessary for the elimination of Timmins Moneta DS, which is the final station supplying load at 4.16 kV in the City core. This investment is planned to be carried out over a 2-year period (2008-2009). The voltage conversion work involves replacing approximately 150 end-of-life wood poles, 80 transformers and removal of Moneta DS.

**Results:**

- Eliminate DS assets that are at end-of-life thereby securing customer reliability.
- Replace 4.16 kV line assets that are at end-of-life with new 27.6/16 kV assets to secure customer reliability, safety and comply with regulatory requirements.
- Reduce peak Line Losses by 50 kW.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets	2.4
Operations, Maintenance & Administration and Removals	0.2
<b>Gross Investment Cost</b>	<b>2.6</b>
Recoverable	-
<b>Net Investment Cost</b>	<b>2.4</b>

\*Includes overhead and Allocated Funds Used During Construction at current rates

## Hydro One Distribution – Investment Justification Wholesale Metering Upgrades

**Investment Driver:** DC205

**Reference #:** D16

**Investment Name:** Wholesale Metering Upgrades

**In-Service:** December, 2008

**Need:**

This investment is needed to upgrade or replace Hydro One Distribution wholesale meter points at the earliest seal expiry date of any meter or recorder of the metering installation to ensure compliance with the required Wholesale Revenue Metering Hardware Standards.

Not proceeding with this investment would expose metering not in compliance with the Market Rules to sanctions and delivery point penalties of up to 1.8 times the line capacity or transformer bank rating. As well, this would result in customer disputes concerning sales and revenues.

**Investment Summary:**

- The Market Rules stipulate that the earliest expiry date of any seal period of any meter forming part of a metering installation (MI), the Metered Market Participant (MMP) for the MI “shall make such alternative arrangement as may be necessary to comply with the provisions” of Chapter 6 of the Market Rules, “and of any policy or standard established by the IESO pursuant to this chapter”.
- Hydro One Distribution has 50 distribution wholesale metering points where seals have or will expire in 2008. In compliance with Market Rules and to meet Measurement Canada requirements, the 50 meter installations will be upgraded as a combination of 45 full upgrades, 1 meter only upgrade and 4 meter cabinet only upgrades.

**Results:**

- Upgrade 50 Hydro One Distribution wholesale metering points due in 2008 at the most economical cost
- Ensuring compliance with the Market Rules and Measurement Canada requirements.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets	11.4
Operations, Maintenance & Administration and Removals	-
<b>Gross Investment Cost</b>	11.4
Recoverable	-
<b>Net Investment Cost</b>	11.4

\*Includes overhead and Allocated Funds Used During Construction at current rates

## Hydro One Distribution - Business Case Summary System-Data Archiving and Management

**Investment Driver: DC 308**

**Reference #: O1**

**Investment Name:** System-Data Archiving and Management

**In-Service Date:** Sept, 2009

**Need:**

This investment is required to develop long term storage for distribution system data captured by ORMS and other operations systems. Effective analysis of distribution system performance trends and management of the asset sustaining programs requires the ability to store, access and evaluate data about past outages over a period of 15 years and therefore increased storage capabilities are needed.

Funding is required to prevent situations where effective analysis of performance trends, asset life and outage restoration could be impaired by the absence of historical distribution information.

**Investment Summary:**

In order to evaluate trends in operating performance, asset life cycle performance and forestry program effectiveness, operating data needs to be retained for up to about a 15 year time horizon. The current historical databases are oriented to the needs of operating and yearly statistical performance reporting and hence have storage capacity limited to about 5 years. Requests by planners for information have to be dealt with by operating staff who devise the appropriate queries for the request objective. As the volume of data increases, greater storage capacity and improved retrieval and analysis tools are needed to allow planners to harvest maximum benefit from this data asset.

This investment will provide long term storage of operating data from ORMS, NMS and other systems (such as weather data feeds) integrated into one archive. It will also provide extraction and analysis tools to allow planners to perform various data mining and correlation studies needed to guide optimum decisions on Distribution System investments.

**Results:**

- Improved targeting of the distribution system investments.
- Reduced labour cost for extracting and analysis of historical data.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets	1.3
Operations, Maintenance & Administration and Removals	-
Gross Investment Cost	1.3
Recoverable	-
Net Investment Cost	1.3

\*Includes overhead and AFUDC at current rates

## Hydro One Distribution - Investment Justification NMS Enhancements for Distribution Monitoring and Control

**Investment Driver:** DC308

**Reference #:** O2

**Investment Name:** NMS Enhancements for Distribution Monitoring and Control

**In-Service Date:** December 2008

**Need:**

This investment is needed to allow maximum benefit to be obtained from the development program to install Distribution Stations Monitoring (DSM) systems and remotely controllable sectionalizers (D1T3Sch3 section 2.2.2).

Not completing this work will result in no real-time monitoring of the Distribution Stations (DS's) and no monitoring and control of Sectionalizers from the OGCC. This means that response to events at DS's with DSM systems and on feeders with sectionalizers will be unnecessarily delayed. Further, the ability to use the NMS Information System to store DS loading data will not be possible and a separate system will have to be developed for this.

**Investment Summary:**

This investment will enhance the NMS and supporting telecom infrastructure at the OGCC and Hub sites to allow the real time monitoring of DS equipped with DSM systems and monitoring and control of feeder sectionalizers.

Monitoring of DSs will allow for faster identification and response to distribution outages and product quality issues (e.g. voltage sag, flicker and momentary outages). It will also allow for better management of heavily loaded DSs. The ability to identify momentary outages (such as may result from momentary tree contact or broken insulator) will allow these to be addressed in a planned fashion at lower cost rather than when they deteriorate to an unplanned outage which results in customer interruption and higher cost emergency response.

Monitoring and control of sectionalizers will also allow for faster identification and response to distribution outages. The location of the fault will be narrowed down to a section of the feeder thereby reducing the time to locate the fault. Also, power restoration will take less time through remote switching of the sectionalizers.

The NMS has an information system which stores all SACDA information for later analysis. Connecting the DMS systems and the sectionalizers to the NMS will allow the NMS information system to be used to store the data concerning operation and loading of DS's avoiding the need and cost for a separate storage system.

**Results:**

- Faster response to outages and product quality problems.
- Improved management of vegetation or insulator problems.
- Integrated and low cost storage of data.

**Costs:**

	<b>2008 (\$M)</b>
Capital* and Minor Fixed Assets	1.0
Operations, Maintenance & Administration and Removals	-
<b>Gross Investment Cost</b>	1.0
Recoverable	-
<b>Net Investment Cost</b>	1.0

\*Includes Overhead and Allowance for Funds Used During Construction at current rates

## Hydro One Networks – Investment Justification Cornerstone Phase 1

**Investment Name:** Cornerstone Phase 1 – EAM Core (\$144M);

**Reference #:** IT1

**In Service:** Q2, 2008 (Phase 1)

**Need:**

The current installation of Indus PassPort is no longer eligible for vendor support. It has been heavily customized to adapt to current requirements. It does not provide full work management and supply chain functionality, nor does it provide a single asset registry “system of record.” Therefore, a significant investment is required or else technology and process solutions will not be available to support the achievement of our business goals and completion of the upcoming capital work program. Moreover, significant internal control and business continuity risks would remain unaddressed.

**Investment Summary:**

PassPort 6 was installed in Hydro One in 1998 and is currently being utilized for supply chain, work management, asset management, and accounts payable. The 1998 installation was compromised due to two key changes in direction: the decision to include the Distribution side of the business in what had previously been a Transmission-only solution; and the decision to have all Y2K products in place certified and tested a year early, by year-end 1998. In order to make the scope achievable in the available time, much of the functionality that was available within the Passport tool was not “turned on” for the business, and the solution was heavily customized during and after go-live to meet business needs. As a legacy, there now exist numerous bolt-ons and custom solutions that interface with PassPort and attempt to overcome the business limitations of that initial solution. These limitations will hinder the ability of the company to meet its aggressive capital program and continuing to maintain the heavily customized PassPort system is costly and complex.

Phase One proposes to replace the Passport functionality with SAP functionality. The scope consists of and is restricted to doing what is required to “turn on” the SAP product and make it work as designed in the business, with no SAP software customizations. In a business context, “what is required” consists of:

- Changing business processes that currently touch PassPort, to maintain or improve business performance. We will not customize the product to accommodate current business processes; rather, we will replace current business processes with industry standard practices.
- We will reconnect to SAP, replace within SAP, or decommission applications in the interest of three criteria:
  - Mitigate project risk (complexity and cost)
  - Enable future Cornerstone phases
  - Minimize life cycle cost to the business
- Migration or replication of data needed to execute the SAP solution
- Establishment of an effective change management capability within the project to minimize disruption, maximize adoption, and reduce the overall cost and risk of implementation.

**Results:**

Phase One will bring the following business benefits to Hydro One:

- Improved Asset Lifecycle Decision-Making
- Enhanced Work-Program Planning & Execution
- Set the stage for subsequent phases of the Hydro one System Replacement Strategy.

**Costs<sup>1</sup>:**

	2006 (\$M)	2007 (\$M)	2008 (\$M)	Total (\$M)
Capital* and MFA	0.0	76.7	50.3	127
OM&A and Removals	4.0	7.0	6.0	17
Gross Investment Cost	4.0	83.7	56.3	144
Capital Contribution				
Net Investment Cost	4.0	83.7	56.3	144

1 Costs for Phase 1 including overhead and AFUDC at current rates. .

## Hydro One Networks – Investment Justification

### Mobile IT

**Investment Name:** Mobile IT

**Reference #:** IT2

**In Service:** Q4 2008

**Need:**

This investment is required to permit field managers' access to critical systems and information regarding work crew projects, field assets and optimal scheduling as part of work management processes.

If this investment is not undertaken there is an ongoing risk of delayed information and/or errors and omissions being encountered with data entry from field notes. Hydro One's overall strategy of a properly equipped mobile work force will be delayed.

**Investment Summary:**

Significant resources are used to both manage and report on field-based activities and to respond to changes driven by events encountered in-process. Project reporting and activity planning based on timely and accurate scheduling of information for both goods and services as well as manpower and equipment require access to critical information using mobile computing tools. Field staff and managers require field utilization of technologies currently accessible only in offices. Current applications require upgrades to effectively manage and control the maintenance activities within Hydro One Distribution.

After consideration of alternatives, the preferred plan is to provide mobile application tools to field staff. This investment will provide tools in the areas of dispatch, work management, time sheets, switch orders and inspections that deliver data to support business processes from Grid Operations to Asset Management, among others. This investment provides additional commercial software products, enhancements to existing software products and the installation, configuration and integration of those products along with associated hardware (database and application servers and hand-held computers).

**Results:**

- *Improved Asset Decision Quality:* Provide immediate access to more comprehensive and integrated asset data in corporate systems, contributing to consistency and timeliness in asset decisions.
- *Increased Throughput:* With the ability to capture more data at source using mobile devices, enable one-time data entry and workflow approval as part of normal business processes.
- *Prevention of rework:* Asset condition assessment surveys on occasion require some rework or a revisit to the site. There is an anticipated general reduction in such rework as this initiative is implemented.
- *Timely investments:* Ability to make good decisions regarding field assets and their replacement scheduling will be assisted by additional and available information. With increased volumes of asset condition information, investment planners can utilize and analyze this information to strengthen decisions that replace assets at the right time, not sooner than required nor too late, avoiding undue risks to service levels.

**Shared Costs:**

	2008 (\$M)
Capital* and MFA (A)	3.0
Operating, Maintenance & Administration and Removals (B)	0.3
<b>Gross Investment Cost (A+B)</b>	<b>3.3</b>
Capital Contribution (C)	-
<b>Net Investment Cost (A+C)</b>	<b>3.0</b>

\*Includes overhead and AFUDC at current rates and Minor Fixed Assets include servers and hand-held computers.

## Hydro One Networks – Investment Justification CSS- CIS Hybrid

**Reference #: IT 3**

**Investment Name:** Customer Information System – Hybrid

**In Service:** Q4 2008

**Need:**

This investment is required to address end-of-life application issues with Customer-1 and other Customer Information Systems and to improve the CIS platform to meet increased service level requirements. The customer contact centres need to update the systems capability to deal with billing and service inquiries stemming from service levels, metering, demand management, LDC rationalization, improved customer satisfaction initiatives, and billing / tariff modifications. Upgrades must be made in advance of consumer demand for information and service.

The solution proposed is to make renovations to some systems and replace portions of other systems as applicable in light of the Cornerstone Strategy. If these selected initiatives are not undertaken the useful life of the current CIS applications will be limited, impact the Smart Meter project, and possibly accelerate the timeframe to fully replace the entire CIS application suite.

**Investment Summary:**

The CIS application suite provides the technology backbone that enables Hydro One Distribution to provide billing, customer contact and care, field services, and open market services to its customers and key constituents. The CIS applications impact the Customer Service Operations and the Field Operation areas of the organization. The CIS system serves as the basis for customer interaction. Currently Hydro One Distribution utilizes 13 applications to provide the following functions for the organization: full customer care for all types of distribution customer billing, service order management, marketing, meter management and contact management, as well as facilitating retail competition for all customers.

The costs for CIS are included in Shared Services capital with the costs allocated 100% to Distribution.

A CIS assessment was conducted to determine the best strategy for Hydro One to utilize its CIS application suite to meet its business needs. Hydro One's specific requirements were compared to an internal solution and to other solutions in the marketplace. The recommendation is to make renovations to some systems and replace portions of other systems where such enhancements would be commercially appropriate or have continuing value. Renovations will be undertaken when resources are available and with due consideration to required regulatory changes and for Smart Metering requirements.

**Results:**

- Updated and enhanced CIS application suite with greater access provided to customer data.
- Lower costs for enhancement projects.

**Shared Costs:**

	2008 (\$M)	Total (\$M)
Hybrid Option	2.0	2.0
Total Capital * and MFA		

Date: August, 2007

Operating, Maintenance & Administration and Removals		
<b>Gross Investment Cost</b>	2.0	2.0
Recoverable		
<b>Net Investment Cost</b>	2.0	2.0

\*Includes overhead and AFUDC at current rates

## Hydro One Networks – Investment Justification Fleet Services 2008 Capital Requirements

**Investment Driver:** Fleet Services 2008 Capital Requirements

**Reference #:** C1

**In-Service Date:** Late 2008

**Need:**

This investment is required to meet vehicle and fleet capital requirements arising from increased work programs and staff growth.

Not proceeding or delaying this investment would lead to lower-than-required fleet levels and mix and a shift to more expensive rental units. Extending the life of the vehicles past their optimum level of economic and reliable operations will result in increased equipment and user operating costs, reduced reliability and unsafe operating conditions.

**Investment Summary:**

Hydro One controls and manages 4,522 fleet units which support the various lines of business (LOBs) including Provincial Lines, Stations, Forestry and Engineering and Construction Services (E&CS). Fleet vehicles must be maintained at an optimum level to comply with various regulations (Highway Traffic Act, CVOR regulations, etc.) and to maintain LOB productivity by minimizing downtime and travel time and taking advantage of technology improvement opportunities.

Present replacement criteria are based on manufacturers' recommendations and repair history. Light vehicles are replaced after 6 years or 170,000 km, service trucks are replaced after 6 years or 200,000 km, and work equipment is replaced after 8 – 10 years or 230,000 km. This is used as a guideline and ultimately it is used in combination with break even analysis, including replacement cost, depreciation, operating cost and potential life expectancy.

Of the capital required in 2008, \$35M is required to replace units which have reached their end of life cycle.

Other key elements of the 2008 capital program include:

- supporting the Forestry Mechanical Brushing Program.
- replacement of a second aging helicopter (over 2007 requirements) which supports the Tx Work Program.
- replacement of an additional 50 rental pickups (over 2007 requirements) with 50 Hydro One-owned units. Analysis has determined that the rental units, which are used for approximately 9 months per year, are more expensive than owned units due to Hydro One's lower borrowing costs.
- additional fleet required for new hires.

**Results:**

- Reduced operating costs and increased reliability

**Shared Costs:**

	2008 (\$M)
Capital* and MFA	51.6
Operating, Maintenance & Administration, and Removals	0.0
Gross Investment Cost	51.6
Capital Contribution	0.0
Net Investment Cost	51.6

\*Includes overheads and AFUDC at standard rates.

## Hydro One Networks – Investment Justification MFA Service Equipment 2008

**Investment Driver:** MFA Service Equipment

**Reference #:** C2

**In-Service Date:** Late 2008

**Need:**

Minor fixed asset expenditures for service equipment are required to replace end of life and obsolete equipment, and to provide sufficient levels of new equipment consistent with work program and staffing expansions.

Service equipment is used by field staff to carry out day-to-day work activities including specialized transportation equipment to and from the work site. This equipment must be maintained at appropriate levels such that work can be executed in a safe and cost effective manner. Inadequate investment will result in equipment breakdowns or increased labour time. Overall this would adversely impact job costs, outage duration, and work program accomplishments.

**Investment Summary:**

Minor fixed asset (MFA) spending for service equipment represents items > \$2000 each exclusive of general computer MFA requirements, real estate MFA requirements and fleet MFA requirements, addressed elsewhere, which are necessary to replace end of life equipment used by field staff to execute the work program in a cost effective manner.

Purchases in this category include:

- Minor specialized transportation equipment such as snowmobiles, all terrain vehicles, boats, barges, and related accessories to transport crews to off-road work sites,
- measuring and testing equipment to carry out a variety of work activities including trouble shooting, performance testing of equipment, wood pole density testing, battery testing, relay test systems, moisture analyzers, circuit breaker testers, resistance testers, etc.,
- tools and a wide range of other miscellaneous equipment such as PCB waste bins, portable generators, cabling trailers and equipment, hand held meter reading devices, satellite equipment for mobile emergency preparedness, insulator power washing equipment to describe a few.
- Relatively large tanker units utilised in the service of transformers including degassifiers used to remove impurities from insulating oil, heated oil tankers, oil filters and dry air machines.

MFA service equipment requirements will vary year to year depending on a number of factors including the overall asset condition, the number of large cost “one-time” items that occur from year to year, the size of the work program and associated staffing levels projected in the business plan, random equipment failures, unanticipated system impacts, weather severity and trends which affect the intensity and use of certain types of equipment particularly related to storm and trouble call programs.

Spending in 2008 is focused on additional service equipment required to accommodate the growth in the work program. It is also the result of end of life replacement of specific large equipment such as oil tankers, degassifiers, and air supply equipment used to overhaul and maintain large power transformers and manage the related oil requirements. Such purchases are a part of long term replacement plans to replace end of life equipment that are expected to extend to 2010 and beyond.

**Results:**

- Maintain equipment and tool fleets at required levels to execute the 2008 transmission OM&A and capital program

**Shared Costs:**

	2008 (\$M)
Capital* and MFA	9.3
Operating, Maintenance & Administration, and Removals	0.0
Gross Investment Cost	9.3
Capital Contribution	0.0
Net Investment Cost	9.3

\*Includes overheads and AFUDC at standard rates.

## Hydro One Networks – Investment Justification Real Estate Facilities 2008

**Investment Driver:** Real Estate Facilities Capital for 2008

**Reference #:** C3

**In-Service Date:** Late 2008

### Need:

This investment provides for facilities improvements, resulting from assessments of aging facilities infrastructure across the Province. The facilities infrastructure base is comprised mainly of aged buildings, legacy building systems and components, many of which are reaching the end of their asset life cycle. This program also considers the facilities portfolio accommodation strategy in terms of facility improvements, building additions and new facilities in line with the Company's changing operational requirements.

Not proceeding with this investment would present risks related to health & safety (related to mould, drinking water quality, and potentially unsafe building structures) that could result in non-compliance with legislative and regulatory requirements.

### Investment Summary:

Key program work activities include:

- Replacement of major building components including roof structures, windows, heating, ventilating and air conditioning (HVAC) systems and other structural elements and building systems.
- Dealing with environmental issues that may arise such as mould.
- Treatment upgrades to improve quality and reliability of water supply, including conversions to municipal supply.
- Facilities Improvements: Service, Administrative Centres
- HQ & Admin Facilities - new/ additional workspace demand – accommodation planning.
- Purchase of MFA at Centres (e.g., office furniture)

There are 92 Administrative Centres and Service Centres throughout the province. Administrative Centres include the Ontario Grid Control Centre in Barrie, London Call Centre, and GTA facilities (Trinity, Clegg Road and Torbram Road). Service Centres provide accommodation for Line of Business field staff, such as Provincial Lines and Forestry.

Contracted facility service providers conduct regular inspections of administrative and service centre sites across the province to ensure critical building/site components are inspected regularly and major structural and related problems are identified.

This capital program focuses on undertaking the critical component replacement work on a priority basis.

Capital spending of \$9.8M is required for 2008 to replace major building components, ensure facility water well standards are met, secure and protect facilities that house critical equipment, and provide space to support work programs.

### Results:

- Improved Administrative and Service Centre facilities through replacement of roof structures, windows, HVAC systems and other structural elements.
- Reduced potential environmental hazards to Hydro One employees with a focus on mould removal and water quality.
- Specific Service Centres will meet Security Standard 1300 and NERC Physical Security of Substations.

### Shared Costs:

	2008 (\$M)
Capital* and MFA	9.8
Operating, Maintenance & Administration, and Removals	0.0
Gross Investment Cost	9.8
Capital Contribution	0.0
Net Investment Cost	9.8

\*Includes overheads and AFUDC at standard rates.